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Assistant Commissioner for Patents
Washington, D. C. 20231

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Re: Patent Application of Brad A. Armstrong

Serial No.: 09/455,821 Filed: 12/06/99

Title: VARIABLE-CONDUCTANCE SENSOR

Applicant's address: Brad A. Armstrong
P.O. Box 1419
Paradise, CA 95967

Applicant now resides in Carson City, NV, but the above mailing address is still good.

Patent Examiner: Easthom, K. Group Art Unit: 2832

IN RESPONSE TO THE OUTSTANDING OFFICE ACTION OF 04/19/00

Dear Sir:

REMARKS

This is responsive to the Office Action mailed 04/19/00, Paper No. 4. Would the Examiner please amend my above specified application as follows, and consider my remarks, followed by reexamining my application in view of this response/amendments and find the claims allowable. Thank you.

Revocation of Power of Attorney

Applicant had a Patent Law firm prepare and file the instant application. The Law firm is no longer involved. "If" a Power of Attorney is currently in effect for this application, it is

hereby revoked. Applicant will be prosecuting the application as a Pro Se Applicant.

A Petition to revive an unintentionally abandoned application under 37 CFR 1.137(b) is attached, as is the $620.00 small entity fee, 37 CFR 1.17m.

Terminal Disclaimers, three separate ones, to alleviate any possible non-statutory Double Patenting attacks against the Patent to issue from the instant application, and $165.00 for the three fee (3x$55) is included.

The fee for additional claims present after entering this amendment, beyond those originally paid for is attached. An Amendment Transmittal Letter showing the claims fee calculations is attached.

Another Information Disclosure Statement is attached, as is the $180.00 fee per 37 CFR 1.17(p) is included.

A letter to the Official Draftsperson, regarding the enclosed 4 sheets of drawings is herewith included.

DRAWINGS

a) Drawing corrections per Form PTO 948:

Please find enclosed herewith formal drawing sheets having Fig. 3 on one sheet, and Fig. 13 on another sheet, these sheets having the corrected top margins as requested in the Form PTO 948 from the Draftsperson. The sheets with Figs. 3 and 13 are to substitute for the corresponding originally filed sheets. Applicant is not sure what size of paper on which the originally filed drawings were sent in by the Attorney. The enclosed drawings are on letter size paper, and "if" the originally submitted drawings were on A4 paper, please let Applicant know so corrected drawing on the proper size paper can be promptly sent.

b) Drawings changes to support claim langauge and "Not" adding new matter:

Please find enclosed herewith two formal drawing sheets having Fig. 1 and Fig. 8 changed from that originally filed to include a single human thumb or finger. Added to Fig. 1 and Fig. 8 is the thumb or finger, an "11" and lead line therefrom to the thumb or finger. The existing number 18 for the actuator has been relocated to make room from the finger/thumb 11. The specification as originally filed includes statements such as "with actuator 18 depressed, such as it would be by a user's finger or thumb"; "human finger/thumb"; for just two examples. The changes to drawing Figs. 1 and 8 are clearly "not" adding new matter to the application. The changes are being made to make sure that the human thumb or finger repeatedly mentioned in the specification and now in the amended claims below, is shown in the drawings. This is to comply with the rule requiring that which is in the claims must be shown in the drawings.

Applicant has not submitted these minor changes to Figs. 1 and 8 in red ink because the changes are so readily ascertained and also minor. If the Examiner wishes red ink drawings, please instruct. Thank you.

The enclosed "changed" drawing sheets having Figs. 1 and 8 are also to be used as substitutes for the originally filed sheets with Figs. 1 and 8, assuming the Examiner approves of the minor changes.

AMENDMENTS

Amendments to the specification:

"Additional" priority claim:

Please amend the application on page one of the specification, to include, in addition to the priority claim to application 09/206,825 now Patent 5,999,084, a priority claim to my co-pending U.S. application serial number 08/677,378 filed July 5,

1996.

The priority claim as amended should read:

--This application is a continuation of prior U.S. Patent Application Serial No. 09/106,825, filed June 29, 1998, now U.S. Patent 5,999,084, the entire contents of which are hereby incorporated by reference. This application is also a continuation-in-part of co-pending U.S. Patent application Serial No. 08/677,378 filed July 5, 1996, now U.S. Patent _____ (to be filed in later).--

Remark/Note: The above new priority claim is supported at least by drawing Fig. 38 and the specification of application serial number 08/677,378. Application 08/677,378 has been allowed and will issue soon. This priority claim to 08/677,378 will effect what is considered "prior art" to the instant invention.

Amendment to the specification:

The single human thumb or finger now shown in Figs. 1 and 8 has been assigned "11" in the drawings, and thus the specification needs to have "11" appropriately included.

In the specification on page 11, line 10, between "invention." and "In the Fig. 2", please insert the sentence --A single thumb 11 or finger 11 is shown depressing actuator 18 in Fig. 1.--

In the specification on page 18, line 34, please insert --11-- after "finger", and again insert --11-- after "thumb". After amending, it should read: "by a user's finger 11 or thumb 11,".

Please cancel the originally filed Abstract of the Disclosure and insert in place thereof the following shorter Abstract.

--ABSTRACT OF THE DISCLOSURE

A sensor having a housing; conductive elements; a resilient dome-cap, and a depressible actuator retained by the housing with a portion thereof exposed to be accessible for depressive force to be applied thereto by a human finger/thumb. The actuator also includes a portion positioned to allow depressive force applied thereto to be applied to the dome-cap. Pressure-sensitive variable-conductance material is contained within the housing and electrically positioned as a variably conductive element in a current flow path between the conductive elements. Depressing the actuator causes the dome-cap to bow downward, causing a user first discernable tactile sensation indicating actuation of the sensor, and transferring force through the dome-cap into the variable-conductance material for providing variable electrical flow between the conductive elements dependant upon the applied pressure. The resilient dome-cap returns to a raised position providing a second discernable feedback.--

AMENDMENTS TO THE CLAIMS

Please cancel claims 1-7.

Please insert claims 8-24 presented for examination and Allowance.

8. A pressure-sensitive variable-conductance analog sensor with tactile feedback actuatable by a human thumb or finger, comprising;

a human thumb or finger;

a housing;

conductive elements at least in-part within said housing;

a depressible actuator retained by said housing and in-part exposed external to said housing for depression by a human thumb or finger for depressing said actuator and receiving tactile

feedback to the thumb or finger from said actuator;

a resilient snap-through dome-cap positioned within said housing and depressible with force from said actuator applied to said dome-cap to cause said dome-cap to snap-through and create the tactile feedback detectable by the thumb or finger depressing the actuator; and

pressure-sensitive variable-conductance material within said housing and positioned as a variably conductive element electrically between said conductive elements, and further positioned for receiving force applied to said dome-cap, whereby electrical conductivity of said pressure-sensitive variable-conductance material is altered relative to received force and electrical output of said sensor with tactile feedback is variable.

9. A pressure-sensitive variable-conductance analog sensor with tactile feedback in accordance with claim 8 wherein said conductive elements are of high and relatively constant conductivity.

10. A pressure-sensitive variable-conductance analog sensor with tactile feedback in accordance with claim 8 wherein said pressure-sensitive variable-conductance material is variable in terms of electrical resistivity, the electrical resistivity of said pressure-sensitive variable-conductance material lowering with received force thereon.

11. A pressure-sensitive variable-conductance analog sensor with tactile feedback in accordance with claim 10 wherein said housing is formed of plastics.

12. An improved pressure-sensitive variable-conductance analog sensor of the type having at least two electrically conductive elements operationally connected to pressure-sensitive variable-conductance material; a depressible actuator retained

relative to said pressure-sensitive variable-conductance material; said actuator in-part exposed to be depressible toward said pressure-sensitive variable-conductance material for transferring force into said pressure-sensitive variable-conductance material;

wherein the improvement comprises:

a resilient snap-through dome-cap positioned to provide tactile feedback into said actuator and to a human user's thumb or finger depressing said actuator.

13. An improved pressure-sensitive variable-conductance analog sensor in accordance with claim 12 wherein said snap-through dome-cap is positioned between said actuator and said pressure-sensitive variable-conductance material.

14. An analog output sensor, comprising;

a single human thumb or finger positioned for actuating

a tactile element, when actuated said tactile element creating a tactile feedback detectable by the single thumb or finger, said tactile element positioned for actuating

pressure-sensitive variable-conductance material for creating varying electrical output representing varying force input by said single human thumb or finger.

15. An analog output sensor according to claim 14 wherein, when deactuated said tactile element creating a tactile feedback detectable by the single thumb or finger.

16. An analog output sensor, comprising;

a single human thumb/finger positioned for depressing

a tactile element, when depressed said tactile element creating a tactile feedback detectable by the single thumb/finger, said tactile element operationally associated with

analog sensor material for creating varying electrical output representing varying force input by said single human

thumb/finger.

17. An analog output sensor according to claim 16 wherein, when released said tactile element creating a tactile feedback detectable by said single human thumb/finger.

18. An analog output sensor, comprising;

a tactile element, positioned to be depressed by only a

a single human thumb or finger, said tactile element when depressed creating

a tactile feedback detectable by said single human thumb or finger, said tactile element operationally associated with

analog sensor material for creating varying electrical output representing varying force input by said single human thumb or finger.

19. An analog output sensor according to claim 18 further including an actuator positioned between said single human thumb or finger and said tactile element.

20. A method of manufacturing a pressure-sensitive analog variable-conductance sensor, comprising the steps of:

forming conductive elements;

locating pressure-sensitive variable-conductance material positioned as a variably conductive element electrically between said conductive elements;

positioning an actuator for transferring force applied by a human thumb or finger onto said pressure-sensitive analog variable-conductance material;

positioning a resilient tactile feedback dome-cap operationally associated with said pressure-sensitive variable-conductance material;

positioning said dome-cap relative to said variable-conductance material and said actuator so that the tactile feedback produced by said dome-cap is detactable by a thumb or

finger on said actuator approximately simultaneously when output of said sensor is varied by an increase in pressure against said pressure-sensitive variable-conductance material.

21. A method of controlling variable output of a variable output sensor, comprising

pressing an actuator with force, using a human finger or thumb, to receive a first tactile feedback to the finger or thumb pressing the actuator,

then,

varying the pressing force for varying the output of the sensor,

followed by

reducing the pressing force until a second tactile feedback is received by the finger or thumb.

22. A method of controlling variable output of a variable output sensor according to claim 21 further including

increasing the pressing force, following the receiving of said second tactile feedback, to receive another tactile feedback and to vary the output of the sensor with further increasing pressing force.

23. A method of controlling a variable output sensor, comprising

pressing an actuator with force, using a thumb or a finger, to receive a first tactile feedback to the thumb or finger pressing the actuator, and using the first tactile feedback as indication of output of the sensor beginning to be varied,

then,

increasing the pressing force for further varying the output of the sensor,

followed by

reducing the pressing force until a second tactile feedback is received by the thumb or finger pressing the actuator, and

using to the second tactile feedback as an indication of the output of the sensor no longer being varied.

24. A method according to claim 23 further including receiving of said second tactile feedback and using said second tactile feedback as indication the sensor is no longer being varied and acting by increasing the pressing force to receive another tactile feedback and again vary the output of the sensor.

REMARKS

Regarding the Office Action Summary: This page has been reviewed, and it is noted claims 1-7 are rejected yet pending.

Regarding page 2, point 1 of the Office Action: The language in claim 7 has been deleted by the claim amendments above.

Regarding page 2, points 2 and 3 of the Office Action: The rejection of the now cancelled claims 1-6 under the nonstatutory double patenting doctrine is noted. Regarding the instant claims as amended above and the claims of Applicant's U.S. Patents 5,999,084; 6,102,802 and 6,135,886; while nonstatutory or statutory double patenting does not appear to now be present, Applicant does not wish, after issuance of this application as a patent, to need to fend off a wrongful Court challenge on the grounds of double patenting. There are many unjust attacks on the validity of patents today, and Applicant does not want an expensive wrongful double patenting attack in the future. Therefore, while the enforceable period of the patent will be reduced somewhat, the reduced period would be acceptable to eliminate an unjust and expensive attack on my Patent (issuing from this application). I have herewith submitted a Terminal Disclaimer and fee payment for each of the three patents 5,999,084; 6,102,802 and 6,135,886 relative to the instant application and the patent which will issue therefrom. Please apply these Terminal Disclaimers.

Regarding page 3, points 4, 5, and 6 of the Office Action: this has been noted.

Regarding page 3, points 4, 5, 6 and 7 on page 4 of the Office Action: Claims 1-7 have been canceled in the above presented amendments and new claims 8-24 added.

The new claims 8-24 are all believed to be allowable over the prior art. No prior art single disclosure teaches or suggests the present claimed invention. No reasonable combination of the prior art teaches or suggests the present claimed invention, and allowance of claim 8-24 is therefore solicited.

More specifically regarding the prior art, Applicant respectfully disagrees that Kambic discloses the claimed invention except for the cap being a dome. Kambic is also just an On and then Off switch. There is no indication in the Kambic document that the material 7 relative to contact 4 and 5 is capable of anything other than ON or OFF electrical states (conducting and not conducting), and there is no indication that the material 7 of the keyboard switch of Kambic is analog capable. Kambic states material 7 "conducts vertically but not laterally", see Kambic line 9, indicating Kambic is only interested in whether material 7 conducts or does not conduct. The Kambic material 7 is "laterally conducting when it is compressed" see line 11, thus clearly Kambic is only interested whether material 7 conducts or does not conduct between contact 4 and 5 as a simple ON/OFF only keyboard switch. The On and then Off switch of Kambic is used in a keyboard in "a conventional row and column encoding matrix". To Applicant's knowledge, a conventional row and column encoding matrix in a keyboard in not conventionally used with a plurality of variable signal analog sensors which are read as analog sensors, as opposed to being read as either On or Off, but, because the Kambic switch is an On and then Off switch, a conventional row and column will work with his switch. Kramer,

while apparently including analog output, does not have a dome shaped cap or tactile feedbacks alerting the user of actuation and then deactuation of the varying of the analog output. Kambic also differs from the present invention by not having a tactile feedback alerting the user of actuation and then deactuation of analog material. The present claims 8-24 include a user discernable feedback or a dome-cap specifically for creating and providing the human user a tactile feedback, whereas, Kambic is clearly trying to make sure that "if" there exists any clicking or the like such as "might" be produced by the Kambic spring 8, that any clicking or the like does not reach the user as a tactile sensation. Note: there is no mention in Kambic of a tactile feedback or the like being produced in his spring 8 of the On / Off switch. Kambic locates an air bag 10 between the spring 8 and key button 3, and then states that the air bag is like "conventional plastic packaging materials", see Kambic page 2. Packaging materials conventionally serve to eliminate or dampen vibration, therefore one can only conclude that Kambic is trying to make sure the user's finger is isolated from any possible tactile feedback. The isolation of a click or the like from the user makes it non-tactile when compared to the present invention. It appears Kambic is trying to create a structure for providing a sensation of typing-on-air, therefore Kambic's "feedback enhancement" must be the diminishment or elimination of any possible tactile feedback from the switching mechanism, and thus

Kambic <u>teaches away</u> from, or opposite to, the present invention regarding the aspect of first and second tactile feedbacks indicating actuation and deactuation. Thus, Kambic does not teach, anticipate or suggest the invention as claimed, but rather, <u>teaches away</u> from this important aspect. The Kambic disclosure directly "teaching away" from the present invention aspect of tactile feedbacks to the user on actuation and deactuation does not allow for a logical suggesting within the Kambic and Murata disclosures that a dome shape member of Murata

be built into Kambic to provide a tactile feedback to the user, it would clearly be against the teaching and suggestions of Kambic.

The present analog output sensor providing tactile feedbacks to the user upon actuation and deactuation of the variable analog output is not taught or suggested by either Kambic or Kramer or Murata, and is not suggested by any reasonable combination of suggestions in the prior art. Nei et al (GB 2058462), Mitchell, Hyodo, Parsons, Teruo, Pine et al, Fujita, and Tsuji et al do in fact disclose sensors, but none are the same of the present invention and there is no reasonable combination suggesting the present invention.

Analog pressure-sensitive variable-conductance material alters the conductivity thereof through a range dependant on force applied thereto so that the sensor has or is structured to provide the desired variable electrical output, i.e. analog output, and this does not mean varying from OFF to ON only. The present invention provides variable analog electrical output proportionally variable to applied varying pressure applied by a single human thumb or finger on the actuator positioned not only to apply pressure but also to receive the tactile feedbacks indicating the beginning of the varying and then the ending of the varying of the analog output so as to provide greatly improved control by the human user as detailed in the present specification. Such is not taught or suggested by the prior art, and therefore allowance of the present claims is respectfully requested.

In view of the herein amendments and remarks in favor of allowance, would the Examiner please reexamine my application and find the claims 8-24 as herein presented allowable over the prior art, thank you.

I hereby declare that all statements made herein of my own

knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Respectfully,

Date: Jan. 29, 2001

Brad A. Armstrong, Inventor

CERTIFICATE OF EXPRESS MAILING

Assistant Commissioner for Patents
Box DAC
Washington, D. C. 20231

I, Brad Armstrong, hereby certify that this complete response regarding U.S. Application Serial No. 09/455,821 is being deposited with the United States Postal Service as EXPRESS MAIL article number EF100282600US with sufficient postage paid in an envelope addressed to: Assistant Commissioner for Patents, Box DAC, Washington, D.C. 20231, on this

date: Jan. 29, 2001

Signature of one making deposit:

Brad A. Armstrong, Inventor